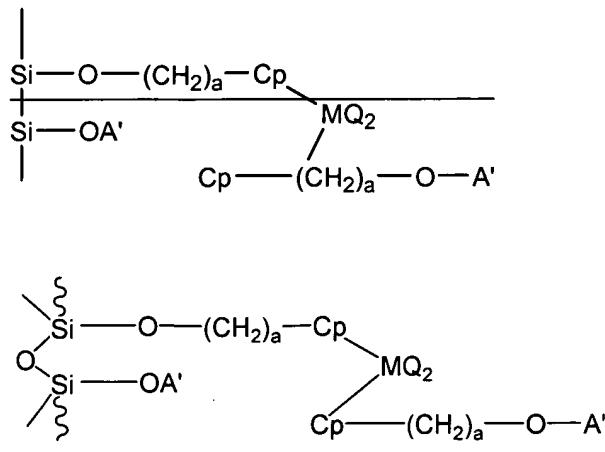


AMENDMENTS TO THE CLAIMS

1-3. (Canceled)

4. (Currently amended) A supported metallocene catalyst of formula:



wherein M comprises a transition metal of Group 4;

Cp, which ~~can be~~ are the same or different, ~~comprises~~ comprise a cyclopentadienyl ring, wherein the cyclopentadienyl ring is unsubstituted or substituted by a moiety selected from the group consisting of alkyl, cycloalkyl, aryl, alkenyl, alkylaryl, arylalkyl, and arylalkenyl;

Q, which ~~can be~~ are the same or different, ~~comprises~~ comprise halogen or a moiety comprising from 1 to 20 carbon atoms, wherein the moiety is selected from the group consisting of alkyl, alkenyl, aryl, alkylaryl, arylalkyl, and alkylidene, ~~wherein the alkyl, alkenyl, aryl, alkylaryl, arylalkyl, and alkylidene~~;

A', which ~~can be~~ are the same or different, is are selected from the group consisting of methoxymethyl, t-butoxymethyl, tetrahydropyranyl, tetrahydrofuranyl, ~~1-ethoxyethyl 1-ethoxyethyl~~, 1-methyl-1-methoxyethyl, and t-butyl; and

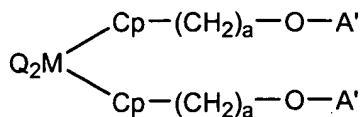
a comprises an integer of from 4 to 8.

5. (Original) The supported metallocene catalyst according to claim 4, wherein A' comprises t-butyl.

6. (Original) The supported metallocene catalyst according to claim 4, wherein a is 6.

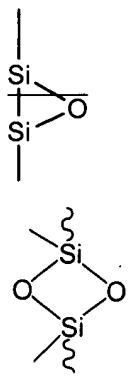
7. (Currently amended) A method for preparing a supported metallocene catalyst, the method comprising the step of:

reacting a metallocene compound of Chemical Formula 7:



7

with a silica support of formula:



in an organic solvent, wherein:

M comprises a transition metal of Group 4;

Cp, which ~~can be~~ are the same or different, ~~comprises~~ comprise a cyclopentadienyl ring, wherein the cyclopentadienyl ring is unsubstituted or substituted by a moiety selected from the group consisting of alkyl, cycloalkyl, aryl, alkenyl, alkylaryl, arylalkyl, and arylalkenyl;

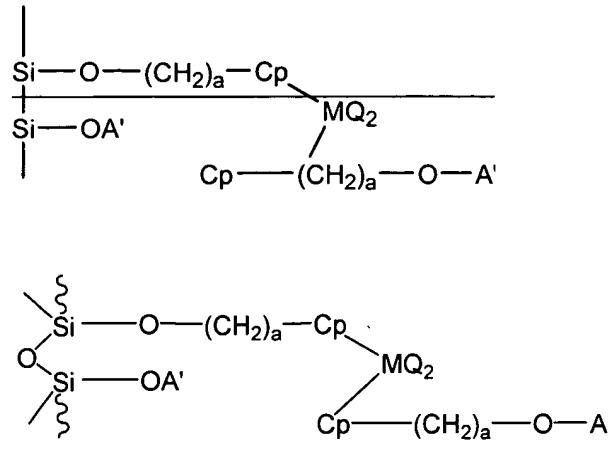
Q, which ~~can be~~ are the same or different, ~~comprises~~ comprise halogen or a moiety comprising from 1 to 20 carbon atoms, wherein the moiety is selected from the group consisting of alkyl, alkenyl, aryl, alkylaryl, arylalkyl, and alkylidene, wherein the alkyl, alkenyl, aryl, alkylaryl, arylalkyl, and alkylidene;

A', which ~~can be~~ are the same or different, is ~~are~~ selected from the group consisting of methoxymethyl, t-butoxymethyl, tetrahydropyranyl, tetahydrofuranyl, ~~1-ethoxylethyl~~ 1-ethoxyethyl, 1-methyl-1-methoxyethyl, and t-butyl; and

a comprises an integer of from 4 to 8;

whereby one reactive bond between a silicon atom and an oxygen atom of the silica support is cleaved, whereby one O-A' bond in the metallocene compound of Chemical Formula 7 is cleaved to yield a metallocene portion and A', and whereby two new bonds are formed, wherein the metallocene portion is bonded to ~~a silica~~ the silicon atom of the silica support via ~~an~~ the oxygen atom previously bonded to A', and

simultaneously A' is bonded to another silica silicon atom of the silica support via an the oxygen atom previously bonded to the silicon atom, to yield a supported metallocene catalyst of formula:



8. (Original) The method according to claim 7, wherein the silica support comprises a hydroxyl group amount of less than 0.5 mmol/g.

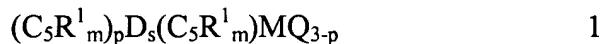
9. (Original) The method according to claim 7, wherein A' comprises t-butyl.

10. (Original) The method according to claim 7, wherein a is 6.

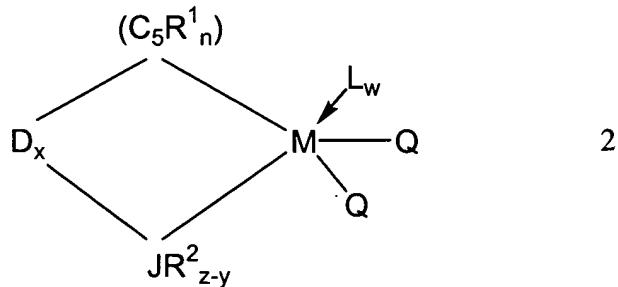
11-14. (Canceled)

15. (Currently amended) A supported metallocene compound prepared by the reaction of:

a) a metallocene compound of Chemical Formula 1 or Chemical Formula 2, wherein Chemical Formula 1 comprises:



and wherein Chemical Formula 2 comprises:



wherein at least one moiety selected from the group consisting of R¹, R², and D comprises a hydrogen atom, and wherein at least one the hydrogen atom of R¹, R², and D is substituted by a group of Chemical Formula 6, wherein:

M is a transition metal of Group 4;

$(C_5R^1_m)$ and $(C_5R^1_n)$ each comprise a cyclopentadienyl ring, wherein each R^1 , which ~~can be~~ are the same or different, is are selected from the group consisting of hydrogen, C_{1-40} alkyl, $C_{1-40} C_{3-40}$ cycloalkyl, $C_{1-40} C_{6-40}$ aryl, $C_{1-40} C_{2-40}$ alkenyl, $C_{1-40} C_{7-40}$ alkylaryl, $C_{1-40} C_{7-40}$ arylalkyl, $C_{1-40} C_{8-40}$ arylalkenyl, and a metalloid of Group 14 substituted by a hydrocarbyl group; and or two R^1 ~~can~~ form a hydrocarbyl group which joins together two adjacent carbon atoms of a cyclopentadienyl ring to form one or more $C_4 - C_{16}$ rings;

D is selected from the group consisting of an alkylene carbon chain, an arylene carbon chain, an alkenylene carbon chain, a dialkyl germanium, a dialkyl silicon, an alkyl phosphine phosphine, an alkyl amine group substituting on and bridging two cyclopentadienyl ligands, and an alkyl amine group substituting on and bridging a cyclopentadienyl ligand and JR^2_{z-y} ligand by -a- covalent bond bonds;

R^2 is selected from the group consisting of hydrogen, C_{1-40} alkyl, $C_{1-40} C_{6-40}$ aryl, $C_{1-40} C_{2-40}$ alkenyl, $C_{1-40} C_{7-40}$ alkylaryl, and $C_{1-40} C_{7-40}$ arylalkyl;

J comprises an element of Group 15 or Group 16;

~~each~~ Q, which ~~can be~~ are the same or different, is are selected from the group consisting of halogen, C_{1-20} alkyl, $C_{1-20} C_{2-20}$ alkenyl, $C_{1-20} C_{6-20}$ aryl, $C_{1-20} C_{7-20}$ alkylaryl, and C_{1-20} alkylidene;

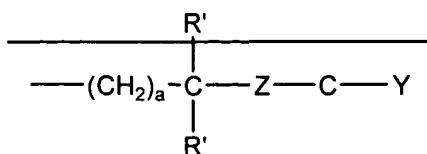
L comprises a Lewis base;

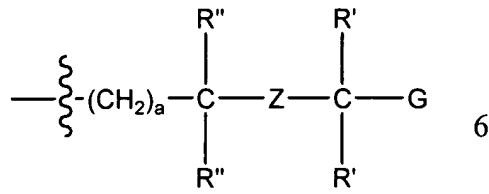
s is 0 or 1 and p is 0, 1 or 2, provided that when p is 0 then s is 0, when s is 1 then m is 4 and p is 1, and when s is 0 then m is 5 and p is 0;

~~z is a valence number of J, provided that when J is an atom element of~~ Group 15 then z is 3, and when J is an atom element of Group 16 then z is 2;

x is 0 or 1, provided that when x is 0 then n is 5, y is 1, and w is greater than 0, and when x is 1, then n is 4, y is 2, and w is 0; and

wherein Chemical Formula 6 comprises:





wherein, Z is oxygen atom or sulfur atom;

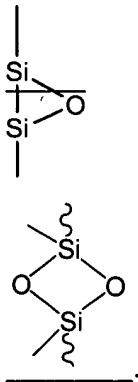
each R', which can be are the same or different, is are selected from the group consisting of hydrogen, C₁₋₂₀ alkyl, C₁₋₂₀ C₃₋₂₀ cycloalkyl, C₁₋₂₀ C₆₋₂₀ aryl, C₁₋₂₀ C₂₋₂₀ alkenyl, C₁₋₂₀ C₇₋₂₀ alkylaryl, C₁₋₂₀ C₇₋₂₀ arylalkyl, and C₁₋₂₀ C₈₋₂₀ arylalkenyl; and or two R' can join are joined together to form a ring;

R'', which are the same or different, are selected from the group consisting of hydrogen, C₁₋₂₀ alkyl, C₃₋₂₀ cycloalkyl, C₆₋₂₀ aryl, C₂₋₂₀ alkenyl, C₇₋₂₀ alkylaryl, C₇₋₂₀ arylalkyl, and C₈₋₂₀ arylalkenyl;

Y G is selected from the group consisting of hydrogen, C₁₋₂₀ alkyl, C₁₋₂₀ C₃₋₂₀ cycloalkyl, C₁₋₂₀ C₆₋₂₀ aryl, C₁₋₂₀ C₂₋₂₀ alkenyl, C₁₋₂₀ C₇₋₂₀ alkylaryl, C₁₋₂₀ C₇₋₂₀ arylalkyl, and C₁₋₂₀ C₈₋₂₀ arylalkenyl, C₁₋₂₀ alkoxy, C₁₋₂₀ C₆₋₂₀ aryloxy, C₁₋₂₀ alkylthio, C₁₋₂₀ C₆₋₂₀ arylthio, phenyl, and substituted phenyl; and Y or G and R' can join together to form a ring;

a is an integer of 4 to 8, provided that when Z is a sulfur atom then Y G is alkoxy or aryloxy; and when Y G is not an alkoxy or aryloxy then Z is an oxygen atom; and

b) a silica support of formula:



16. (Currently amended) The supported metallocene compound according to claim 15, wherein Y G is selected from the group consisting of hydrogen, C₁₋₂₀ alkyl, C₁₋₂₀ C₃₋₂₀

cycloalkyl, $C_{1-20}C_{6-20}$ aryl, $C_{1-20}C_{2-20}$ alkenyl, $C_{1-20}C_{7-20}$ alkylaryl, $C_{1-20}C_{7-20}$ arylalkyl, $C_{1-20}C_{8-20}$ arylalkenyl, phenyl, and substituted phenyl.

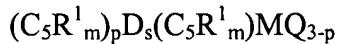
17. (Currently amended) The supported metallocene compound according to claim 15, wherein Y G comprises t-butyl.

18. (Original) The supported metallocene compound according to claim 15, wherein the silica support comprises a hydroxyl group amount of less than 0.5 mmol/g.

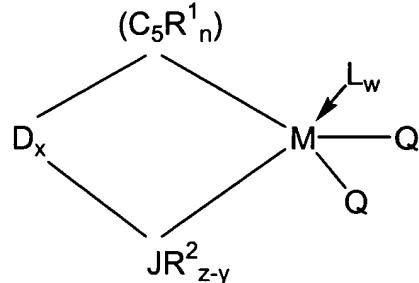
19. (Original) The supported metallocene compound according to claim 15, wherein a is 6.

20. (Currently amended) A method for preparing a supported metallocene compound, the method comprising the step of:

reacting a metallocene compound of Chemical Formula 1 or Chemical Formula 2 with a silica support in an organic solvent, wherein Chemical Formula 1 comprises:



and wherein Chemical Formula 2 comprises:



wherein at least one moiety selected from the group consisting of R^1 , R^2 , and D comprises a hydrogen atom, and wherein at least one the hydrogen atom of R^1 , R^2 , and D is substituted by a group of Chemical Formula 6, wherein:

M is a transition metal of Group 4;

$(C_5R^1_m)$ and $(C_5R^1_n)$ each comprise a cyclopentadienyl ring, wherein each R^1 , which ~~can be~~ are the same or different, is are selected from the group consisting of hydrogen, C_{1-40} alkyl, $C_{1-40}C_{3-40}$ cycloalkyl, $C_{1-40}C_{6-40}$ aryl, $C_{1-40}C_{2-40}$ alkenyl, $C_{1-40}C_{7-40}$ alkylaryl, $C_{1-40}C_{7-40}$ arylalkyl, $C_{1-40}C_{8-40}$ arylalkenyl, and a metalloid of Group 14 substituted by a hydrocarbyl group; and or two R^1 ~~can~~ form a hydrocarbyl group which joins together two adjacent carbon atoms of a cyclopentadienyl ring to form one or more $C_4 - C_{16}$ rings;

D is selected from the group consisting of an alkylene carbon chain, an arylene carbon chain, an alkenylene carbon chain, a dialkyl germanium, a dialkyl silicon, an alkyl phospine phosphine, an alkyl amine group substituting on and bridging two cyclopentadienyl ligands, and an alkyl amine group substituting on and bridging a cyclopentadienyl ligand and JR^{2-z-y} ligand by -a- covalent bond bonds;

R^2 is selected from the group consisting of hydrogen, C_{1-40} alkyl, $C_{1-40}C_{6-40}$ aryl, $C_{1-40}C_{2-40}$ alkenyl, $C_{1-40}C_{7-40}$ alkylaryl, and $C_{1-40}C_{7-40}$ arylalkyl;

J comprises an element of Group 15 or Group 16;

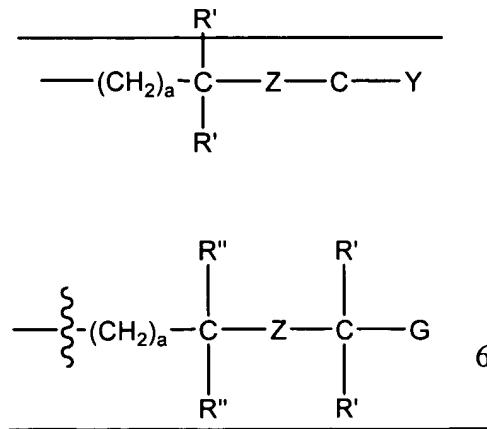
each Q, which can be are the same or different, is are selected from the group consisting of halogen, C_{1-20} alkyl, $C_{1-20}C_{2-20}$ alkenyl, $C_{1-20}C_{6-20}$ aryl, $C_{1-20}C_{7-20}$ alkylaryl, and C_{1-20} alkylidene;

L comprises a Lewis base;

s is 0 or 1 and p is 0, 1 or 2, provided that when p is 0 then s is 0, when s is 1 then m is 4 and p is 1, and when s is 0 then m is 5 and p is 0;

z is a valence number of J, provided that when J is an atom element of Group 15 then z is 3, and when J is an atom element of Group 16 then z is 2;

x is 0 or 1, provided that when x is 0 then n is 5, y is 1, and w is greater than 0, and when x is 1, then n is 4, y is 2, and w is 0; and
wherein the group of Chemical Formula 6 comprises:



wherein, Z is an oxygen atom or a sulfur atom;

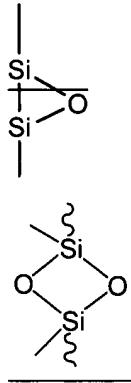
each R', which ~~can be~~ are the same or different, is are selected from the group consisting of hydrogen, C₁₋₂₀ alkyl, C₁₋₂₀ C₃₋₂₀ cycloalkyl, C₁₋₂₀ C₆₋₂₀ aryl, C₁₋₂₀ C₂₋₂₀ alkenyl, C₁₋₂₀ C₇₋₂₀ alkylaryl, C₁₋₂₀ C₇₋₂₀ arylalkyl, and C₁₋₂₀ C₈₋₂₀ arylalkenyl; and or two R' ~~can~~ join together to form a ring;

R'', which are the same or different, are selected from the group consisting of hydrogen, C₁₋₂₀ alkyl, C₃₋₂₀ cycloalkyl, C₆₋₂₀ aryl, C₂₋₂₀ alkenyl, C₇₋₂₀ alkylaryl, C₇₋₂₀ arylalkyl, and C₈₋₂₀ arylalkenyl;

Y G is selected from the group consisting of hydrogen, C₁₋₂₀ alkyl, C₃₋₂₀ cycloalkyl, C₁₋₂₀ C₆₋₂₀ aryl, C₁₋₂₀ C₂₋₂₀ alkenyl, C₁₋₂₀ C₇₋₂₀ alkylaryl, C₁₋₂₀ C₇₋₂₀ arylalkyl, and C₁₋₂₀ C₈₋₂₀ arylalkenyl, C₁₋₂₀ alkoxy, C₁₋₂₀ C₆₋₂₀ aryloxy, C₁₋₂₀ alkylthio, C₁₋₂₀ C₆₋₂₀ arylthio, phenyl, and substituted phenyl; and or Y G and R' ~~can~~ join together to form a ring;

a is an integer of 4 to 8, provided that when Z is a sulfur atom then Y G is alkoxy or aryloxy; and when Y G is not an alkoxy or aryloxy then Z is an oxygen atom; and

wherein the silica support is of formula:



whereby a reactive bond between a silicon atom and an oxygen atom of the silica support is cleaved, whereby ~~an oxygen-carbon~~ a bond between an oxygen atom and a carbon atom in Chemical Formula 6 of the metallocene compound is cleaved to yield a metallocene compound portion comprising the oxygen atom and a remaining portion comprising the carbon atom, and whereby the metallocene compound portion is bonded to ~~a silica~~ the silicon atom of the silica support ~~via an oxygen atom~~, and simultaneously the remaining portion is bonded to ~~another silica~~ atom of the silica support ~~via an~~ the oxygen atom of the silica support.

Appl. No. : **10/666,618**
Filed : **September 18, 2003**

AMENDMENTS TO THE DRAWINGS

The drawings filed on September 18, 2003 have been objected to. Applicants respectfully submit the enclosed four sheets of replacement drawings to replace those submitted with the application as filed. No new matter has been included. Accordingly, applicants respectfully request that the objection be withdrawn.